

## Space-saving Dual Output Signal Conditioners Mini-MW Series

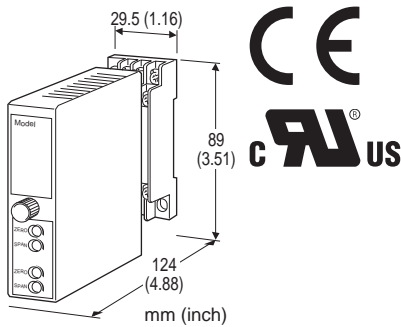
### RTD TRANSMITTER

#### Functions & Features

- Accepts direct input from an RTD
- Linearization
- Burnout
- "Active bridge" circuit containing two constant current sources allows large leadwire resistances up to 200 Ω
- Fast response type available
- CE marking
- UL approval

#### Typical Applications

- Long distance transmission between the RTD and the transmitter
- Combination with intrinsic safety barriers



### MODEL: W2RS-[1][2][3]-[4][5]

#### ORDERING INFORMATION

- Code number: W2RS-[1][2][3]-[4][5]
- Specify a code from below for each [1] through [5].  
(e.g. W2RS-4A6-M2/BL/CE/Q)
- Temperature range (e.g. 0 - 500°C)
  - Special output ranges (For codes Z & 0)
  - Specify the specification for option code 'Q.'  
(e.g. /C01/V01)
- For the input code C, specify also the following. If not specified, Cu 10 Ω @25°C (usable range -200 - +260°C) will be used.
- Input type (e.g. Cu 10 Ω)
  - Resistance range (e.g. 9.038 - 12.891 Ω)
- Note: If one of the outputs should be a current range, specify it for the Output 1 to allow a greater load.

### [1] INPUT RTD (2- or 3-wire)

- 1:** JPt 100 (JIS'89)  
(Usable range: -200 to +500°C, -328 to +932°F; min.span: 50°C, 90°F)
- 3:** Pt 100 (JIS'89)  
(Usable range: -200 to +650°C, -328 to +1202°F; min.span: 50°C, 90°F)
- 4:** Pt 100 (JIS'97, IEC)  
(Usable range: -200 to +650°C, -328 to +1202°F; min.span: 50°C, 90°F)
- 5:** Pt 50 Ω (JIS'81)  
(Usable range: -200 to +500°C, -328 to +932°F; min.span: 100°C, 180°F)
- 6:** Ni 508.4 Ω  
(Usable range: -50 to +200°C, -58 to +392°F; min.span: 30°C, 54°F)
- C:** Cu (Refer to 'Cu INPUT'.)
- 0:** Specify

### [2] OUTPUT 1

#### Current

- A:** 4 - 20 mA DC (Load resistance 750 Ω max.)
- B:** 2 - 10 mA DC (Load resistance 1500 Ω max.)
- C:** 1 - 5 mA DC (Load resistance 3000 Ω max.)
- D:** 0 - 20 mA DC (Load resistance 750 Ω max.)
- E:** 0 - 16 mA DC (Load resistance 900 Ω max.)
- F:** 0 - 10 mA DC (Load resistance 1500 Ω max.)
- G:** 0 - 1 mA DC (Load resistance 15 kΩ max.)
- Z:** Specify current (See OUTPUT SPECIFICATIONS)

#### Voltage

- 1:** 0 - 10 mV DC (Load resistance 10 kΩ min.)
- 2:** 0 - 100 mV DC (Load resistance 100 kΩ min.)
- 3:** 0 - 1 V DC (Load resistance 1000 Ω min.)
- 4:** 0 - 10 V DC (Load resistance 10 kΩ min.)
- 5:** 0 - 5 V DC (Load resistance 5000 Ω min.)
- 6:** 1 - 5 V DC (Load resistance 5000 Ω min.)
- 0:** Specify voltage (See OUTPUT SPECIFICATIONS)

### [3] OUTPUT 2

**Y:** None

#### Current

- A:** 4 - 20 mA DC (Load resistance 350 Ω max.)
- B:** 2 - 10 mA DC (Load resistance 700 Ω max.)
- C:** 1 - 5 mA DC (Load resistance 1400 Ω max.)
- D:** 0 - 20 mA DC (Load resistance 350 Ω max.)
- E:** 0 - 16 mA DC (Load resistance 430 Ω max.)
- F:** 0 - 10 mA DC (Load resistance 700 Ω max.)
- G:** 0 - 1 mA DC (Load resistance 7000 Ω max.)
- Z:** Specify current (See OUTPUT SPECIFICATIONS)

#### Voltage

Same range availability as Output 1

### [4] POWER INPUT

#### AC Power

- M2:** 100 - 240 V AC (Operational voltage range 85 - 264 V, 47 - 66 Hz)

(90 – 264 V for UL)

## DC Power

**R:** 24 V DC

(Operational voltage range 24 V  $\pm$ 10 %, ripple 10 %p-p max.)

**R2:** 11 – 27 V DC

(Operational voltage range 11 – 27 V, ripple 10 %p-p max.)

(Select 'N' for 'Standards & Approvals' code.)

**P:** 110 V DC

(Operational voltage range 85 – 150 V, ripple 10 %p-p max.)

(110 V  $\pm$ 10 % for UL)

## [5] OPTIONS (multiple selections)

### Response Time (0 - 90 %)

**blank:** Standard ( $\leq$  0.5 sec.)

**/K:** Fast Response (Approx. 25 msec.)

### Burnout

**blank:** Upscale burnout

**/BL:** Downscale burnout

### Standards & Approvals (must be specified)

**/N:** Without CE or UL

**/CE:** CE marking

**/UL:** UL approval, CE marking

### Other Options

**blank:** none

**/Q:** Option other than the above (specify the specification)

(UL not available)

## SPECIFICATIONS OF OPTION: Q (multiple selections)

### COATING (For the detail, refer to M-System's web site.)

**/C01:** Silicone coating

**/C02:** Polyurethane coating

**/C03:** Rubber coating

### ADJUSTMENT

**/V01:** Multi-turn fine adjustment

### TERMINAL SCREW MATERIAL

**/S01:** Stainless steel

## GENERAL SPECIFICATIONS

**Construction:** Plug-in

**Connection:** M3 screw terminals (torque 0.8 N·m)

**Housing material:** Flame-resistant resin (black)

**Isolation:** Input to output 1 to output 2 to power

**Overrange output:** Approx. -10 to +120 % at 1 - 5 V

**Zero adjustment:** -5 to +5 % (front)

**Span adjustment:** 95 to 105 % (front)

**Burnout:** Upscale standard;downscale optional

**Linearization:** Standard (not available for the input code C)

## INPUT SPECIFICATIONS

**Input:** 2- or 3-wire RTD (Refer to 'Cu Input' for the input code C.)

**Maximum leadwire resistance:** 200  $\Omega$  per wire (3-wire)

**Sensing current:** 2 mA (Pt);1 mA (Ni 508.4  $\Omega$ )

## OUTPUT SPECIFICATIONS

■ **DC Current:** 0 – 20 mA DC

**Minimum span:** 1 mA

**Offset:** Max. 1.5 times span

**Load resistance:** Output drive 15 V max. for Output 1;

7 V max. for Output 2

■ **DC Voltage:** -10 – +12 V DC (up to 10 V for Output 2)

**Minimum span:** 5 mV

**Offset:** Max. 1.5 times span

**Load resistance:** Output drive 1 mA max.; at  $\geq$  0.5 V

## INSTALLATION

### Power Consumption

#### •AC Power input:

Approx. 4 VA at 100 V

Approx. 5 VA at 200 V

Approx. 6 VA at 240 V

#### •DC power input:

Approx. 3 W

**Operating temperature:** -5 to +55°C (23 to 131°F)

**Operating humidity:** 30 to 90 %RH (non-condensing)

**Mounting:** Surface or DIN rail

**Weight:** 200 g (0.44 lbs)

## PERFORMANCE in percentage of span

**Accuracy:**  $\pm$ 0.2 %

Refer to 'Cu INPUT' for the input code C.

**Temp. coefficient:**  $\pm$ 0.015 %/°C ( $\pm$ 0.008 %/°F)

Refer to 'Cu Input' for the input code C.

**Burnout response:**  $\leq$  10 sec.

**Line voltage effect:**  $\pm$ 0.1 % over voltage range

**Insulation resistance:**  $\geq$  100 M $\Omega$  with 500 V DC

**Dielectric strength:** 2000 V AC @1 minute (input to output 1 to output 2 to power to ground)

## Cu INPUT

### ■ INPUT

#### • Sensing current (resistance span):

140  $\Omega$   $\leq$  Span  $\leq$  300  $\Omega$  : 1 mA

12  $\Omega$   $\leq$  Span  $<$  140  $\Omega$  : 2 mA

8  $\Omega$   $\leq$  Span  $<$  12  $\Omega$  : 3 mA

3.5  $\Omega$   $\leq$  Span  $<$  8  $\Omega$  : 5 mA

#### • Max. leadwire resistance:

200  $\Omega$  or the value calculated using the equation below, whichever is smaller.

Leadwire resistance( $\Omega$ ) = (2500 - 100% resistance( $\Omega$ ) × Sensing current(mA)) ÷ (3 × Sensing current(mA))

• **Usable range:**

3.5  $\Omega$  ≤ Resistance span( $\Omega$ ) ≤ 300 $\Omega$

100 % resistance( $\Omega$ ) < (2500 - 3 × Leadwire resistance ( $\Omega$ ) × Sensing current (mA)) ÷ Sensing current (mA)

■ **PERFORMANCE**

• **Accuracy**

Resistance span ≥ 20  $\Omega$ : ±0.2 %

Otherwise use the equation below:

Accuracy(%) = 0.02( $\Omega$ ) ÷ Resistance span( $\Omega$ ) × 100 + 0.1(%) × 40(mV) ÷ (Resistance span( $\Omega$ ) × Sensing current(mA))

• **Temperature coefficient**

Resistance span( $\Omega$ ) × Sensing current(mA) ≥ 40(mV):

±0.015 %/°C

Otherwise use the equation below:

Temperature coefficient(%/°C) = 0.015(%/°C) × 40(mV) ÷ (Resistance span( $\Omega$ ) × Sensing current(mA))

## STANDARDS & APPROVALS

**CE conformity:**

EMC Directive (2004/108/EC)

EMI EN 61000-6-4: 2007

EMS EN 61000-6-2: 2005

Low Voltage Directive (2006/95/EC)

EN 61010-1: 2001

Installation Category II

Pollution Degree 2

Input or output 1 or output 2 to power input:

Reinforced insulation (300 V)

Input to output 1 to output 2: Basic insulation (300 V)

**Approval:**

UL/C-UL nonincendive Class I, Division 2,

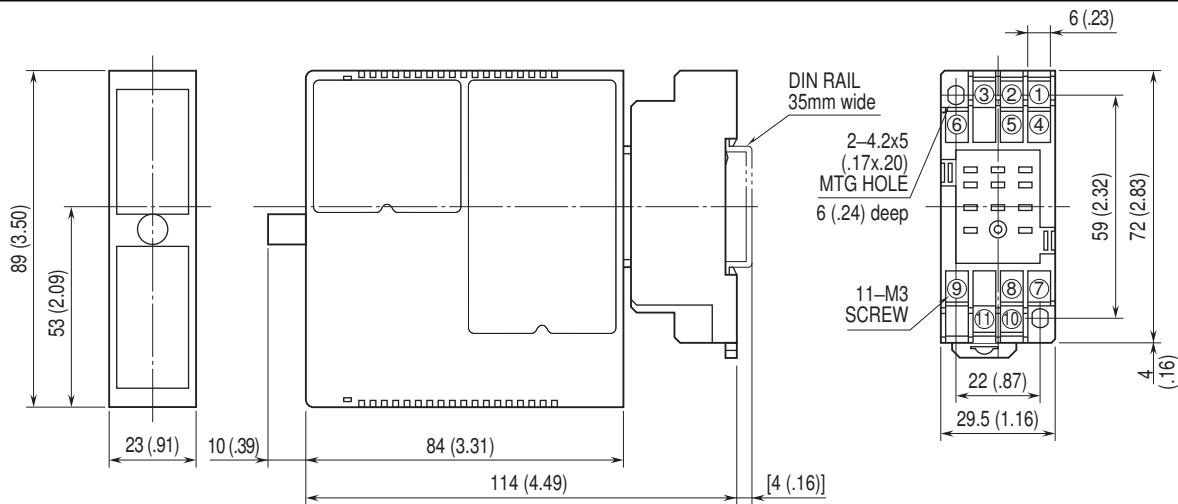
Groups A, B, C, and D hazardous locations

(UL 1604:2004, CAN/CSA-C22.2 No.213:1987)

UL/C-UL general safety requirements

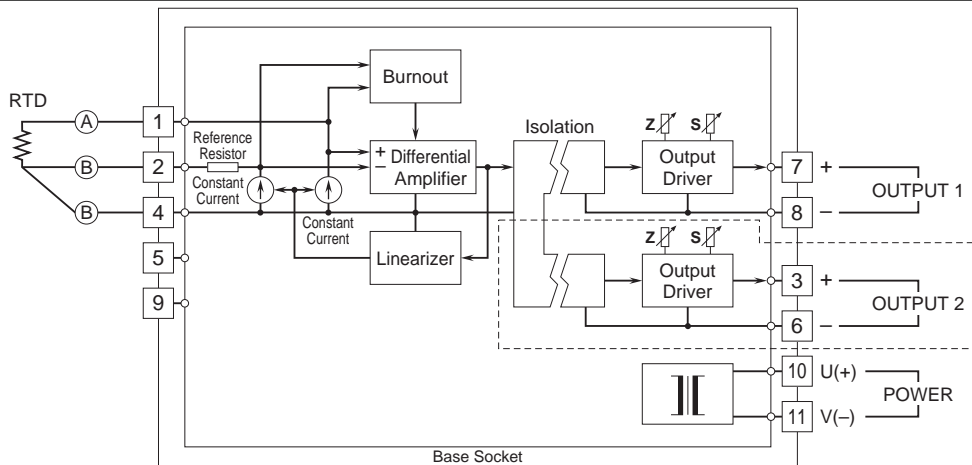
(UL 61010B-1:2003, CAN/CSA-C22.2 No.61010-1:1992)

## DIMENSIONS unit: mm (inch)



When mounting, no extra space is needed between units.

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Remark: The section enclosed by broken line is only with 2nd output option.



Specifications are subject to change without notice.